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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,813	12/04/2003	Chris Boyer	LYNN/0165	7457
24945	7590	08/15/2006	EXAMINER	
STREETS & STEELE 13831 NORTHWEST FREEWAY SUITE 355 HOUSTON, TX 77040			WILLIAMS, SHERMANDA L	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/727,813

Applicant(s)

BOYER ET AL.

Examiner

Shermanda L. Williams

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-68 is/are pending in the application.
- 4a) Of the above claim(s) 33-68 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

FUEL CELL WITH RECOMBINATION CATALYST

Examiner: Williams S.N. 10/727,813 Art Unit: 1745

Response to Amendment

The Amendment After Non-Final filed 6/7/2006 is acknowledged.

Response to Arguments

1. Applicant's arguments with respect to claims 1-32 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claims 4, 8, 19, and 23 are objected to because of improper Markush language. The proper Markush language is "selected from the group consisting ofand....".
Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 30, 31, and 32 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 30-32 are method of operation claims and do not further limit the product set forth in claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathias et al. (US 6,824,909). Mathias discloses a fuel cell membrane with a hydrogen oxidation catalyst embedded therein. Mathias teaches a fuel cell with an ionically conducting proton exchange membrane constructed from perfluorinated sulfonic acid (col.1 lines 32-34). The oxidation catalyst is platinum (col. 3 lines 39-42; claim 5). The hydrogen and oxygen distribution system contains the respective anode or cathode face of the proton exchange membrane. As the hydrogen and oxygen (via carry-over) passes through the proton exchange membrane traveling to the cathode, the recombination catalyst in the membrane causes the formation of water (col. 2 lines 13-20). It would have been obvious to one having ordinary skill in the art at the time of the invention to dispose a recombination catalyst in the hydrogen or oxygen distribution system to produce water in the cell. The water hydrates the cell and decreases the chance of poor cell performance due to becoming dried-out. As well, the crossover

Art Unit: 1745

oxygen is not allowed to form hydrogen peroxide which degrades the polymer membrane (col. 3 lines 45-52) of the fuel cell.

6. Claims 6, 7, 8, 9, 10, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathis as applied to claim 1 above, and further in view of Shimamune (US 2004/0247978). Shimamune discloses a bipolar plate and a method of producing such a plate for a fuel cell. The binder used to bind the platinum catalyst within the electrode structure is a fluorocarbon resin (paragraph 146). The gas passages are formed for the flow of the reactant through the passages that are in communication with the platinum catalyst (paragraph 146). The catalyst may be supported by a rigid substrate that may act as the current collector (paragraph 145). The rigid substrate is taught to be an expanded metal mesh, a porous carbon plate, or a porous metal plate. The electrode described above may be the anode or the cathode electrode (paragraph 141). When the electrode is employed as the cathode the catalyst is disposed on the surface of the hydrogen distribution system (Example 5). The platinum-group metal or recombination catalyst is has excellent conductivity and does not reduce the electrical communication of the fuel cell components (paragraph 28). It would have been obvious to one having ordinary skill in the art at the time of the invention to construct a fuel cell with a recombination catalyst that is structurally supported and does not obstruct the electrical communication between the cell components.

7. As well, claims 10 and 11 are product-by-process claims. The claims are alternatively unpatentable. The courts have ruled that product-by-process limitations, in

Art Unit: 1745

the absence of unexpected results, are obvious. See MPEP 2113. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. The products of claims 10 and 11 and that of claim 7 appear to be the same. Both the cited reference and the claimed invention teach a recombination catalyst applied to the surface of the hydrogen distribution system.

8. Claims 13, 14, 15, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathias as applied to claim 1 above, and further in view of Cisar (US 6,602,631). Cisar discloses various methods for bonding subassemblies of an electrochemical cell. The bond types are metal-to-metal, polymer-to-metal, and polymer-to-polymer depending on the material of construct of the components being bonded together (col. 4 lines 45-52). Soldering is taught as a conductive method used in a metal-to-metal bonding application (col. 6 lines 63-65) for internal components of the fuel cell. The bonding of a plate and flow field is taught (col. 2 lines 52-58; col. 3 lines 12-14). It would have been obvious to one having ordinary skill in the art at the time of the invention to use the soldering technique taught by Cisar to bond a metal flow field and a metal bipolar plate. This well known technique in the art creates a conductive bond between the members that it joins.

9. Also, Cisar teaches a conductive adhesion material for use in bonding two or more metal members (col. 8 lines 42-52). The use of Pd/Ag filled Epoxy is disclosed. It would have been obvious to one having ordinary skill in the art at the time of the

invention to use a conductive bonding agent to connect metal components of a fuel cell due to its good adhesion and cohesion properties (Table II).

10. As well, claims 14, 15, and 17 are product-by-process claims. The claims are alternatively unpatentable. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. See MPEP 2113. The product of claim 14 and 15 and that of claim 13 appear to be the same. Both the cited reference and the claimed invention teach a metal-to-metal bond between metal components of the fuel cell. The product of claim 17 and that of claim 16 appear to be the same. Both the cited reference and the claimed invention teach a conductive adhesive bond between metal and non-metals components of the fuel cell.

11. Furthermore in regards to claims 15 and 17, the applicant has not asserted any criticality to the order of completion of the steps presented in claims 15 or 17. The results of completing the steps presented in claim 15 do not appear to be dependent upon order. The results of completing the steps of claim 15, regardless of the order do not appear to be patentably distinct. The results of completing the steps presented in claim 17 do not appear to be dependent upon order. The results of completing the steps of claim 17, regardless of the order do not appear to be patentably distinct.

12. Claims 18, 19, 20, 21, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathis as applied to claim 1 above, and further in view of Shimamune. The electrode described below may be the anode or the cathode electrode (paragraph 141). The binder used to bind the platinum catalyst within the electrode structure is a fluorocarbon resin (paragraph 146). The gas passages are

Art Unit: 1745

formed for the flow of the reactant through the gas passages in communication with the platinum catalyst of the membrane electrode assembly (paragraph 146). The catalyst may be supported by a rigid substrate that may act as the current collector (paragraph 145). The rigid substrate is taught to be an expanded metal mesh, a porous carbon plate, or a porous metal plate. When the electrode is employed as the anode or counter electrode the catalyst is disposed on the surface of the hydrogen distribution system (Example 15). The platinum-group metal or recombination catalyst is has excellent conductivity and does not reduce the electrical communication of the fuel cell components (paragraph 28). It would have been obvious to one having ordinary skill in the art at the time of the invention to construct a fuel cell with a recombination catalyst that is structurally supported and does not obstruct the electrical communication between the cell components. The recombination catalyst in the oxygen distribution system promotes the production of water needed to hydrate the fuel cell. The presence of a recombination catalyst decreases the possibility of poor cell performance due to the cell drying out and the safety concerns associated with hydrogen build up.

13. As well, claims 21 and 22 are product-by-process claims. The claims are alternatively unpatentable. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. See MPEP 2113. The product of claim 21 and 22 and that of claim 18 appear to be the same. Both the cited reference and the claimed invention teach a recombination catalyst applied to the surface of the oxygen distribution system of the fuel cell.

Art Unit: 1745

14. Claims 24, 25, 26, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathias as applied to claim 1 above, and further in view of Cisar. Cisar discloses various methods for bonding subassemblies of an electrochemical cell. The bond types are metal-to-metal, polymer-to-metal, and polymer-to-polymer depending on the material of construct of the components being bonded together (col. 4 lines 45-52). Soldering is taught as a conductive method used in a metal-to-metal bonding application (col. 6 lines 63-65) for internal components of the fuel cell. The bonding of a plate and flow field is taught (col. 2 lines 52-58; col. 3 lines 12-14). It would have been obvious to one having ordinary skill in the art at the time of the invention to use the soldering technique taught by Cisar to bond a metal flow field and a metal bipolar plate. This well known technique in the art creates a conductive bond between the members that it joins.

15. Likewise, Cisar teaches a conductive adhesion material for use in bonding two or more metal members (col. 8 lines 42-52). The use of Pd/Ag filled Epoxy is disclosed. It would have been obvious to one having ordinary skill in the art at the time of the invention to use a conductive bonding agent to connect metal components of a fuel cell due to its good adhesion and cohesion properties (Table II).

16. As well, claims 25, 26, and 28 are product-by-process claims. The claims are alternatively unpatentable. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. See MPEP 2113. The product of claims 25 and 26 and that of claim 24 appear to be the same. Both the cited reference and the claimed invention teach a metal-to-metal bond between metal components of

the fuel cell. The product of claim 28 and that of claim 27 appear to be the same.

Both the cited reference and the claimed invention teach a conductive adhesive bond between metal and non-metal components of the fuel cell.

17. Furthermore in regards to claims 26 and 28, the applicant has not asserted any criticality to the order of completion of the steps presented in claims 26 or 28. The results of completing the steps presented in claim 26 do not appear to be dependent upon order. The results of completing the steps of claim 6, regardless of the order do not appear to be patentably distinct. The results of completing the steps presented in claim 28 do not appear to be dependent upon order. The results of completing the steps of claim 28, regardless of the order do not appear to be patentably distinct.

18. Claim 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathias et al. as applied to claim 1 above, also Mathias discloses for a proton exchange membrane fuel cell, the cathode reactant (oxygen) can be supplied in pure form or as an air mixture (col. 1 lines 40-44). It would have been obvious to one having ordinary skill in the art at the time of the invention to employ an air distribution system as the oxygen supply due to an unlimited air supply and the elimination of extra components associated with supplying pure oxygen to a fuel cell.

19. Claims 30, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathias (as discussed above for claim 1). Claims 30, 31, and 32 are method of operation claims and are not being given patentable weight due to the fact that claim 1 does not declare a method of operation. All structural limitations of claims 30, 31, and 32 have been addressed in the rejection of claim 1. The ability to operate

Art Unit: 1745


the oxygen and hydrogen distribution systems of the fuel cell of claim 1 above or below atmospheric pressure as well as the ability to operate the two distribution systems at different pressures is possessed by the prior art.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shermanda L. Williams whose telephone number is (272) 571-8915. The examiner can normally be reached on Mon.-Thurs. 7 AM - 4:30 PM and alternating Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (272) 571-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


TRACY DOVE
PRIMARY EXAMINER